



**2017 Global Optical
Time-domain Reflectometer (OTDR)
New Product Innovation Award**

FROST & SULLIVAN

BEST
2017 PRACTICES
AWARD

GLOBAL OPTICAL
TIME-DOMAIN REFLECTOMETER (OTDR)
NEW PRODUCT INNOVATION AWARD

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Background and Company Performance

Industry Challenges

One of the major challenges for today's telecommunication network is to provide fiber access to customers and businesses in the last mile. Copper and Coax cables are still widely used and deploying fiber to replace existing media cables for the last mile is expensive. Since it is difficult and time-consuming to implement, several operators are feeling the pressure to get it done sooner, rather than later. Fiber deployment in the last mile is vital to achieve improved network service and increased bandwidth to ensure higher data transmission. An increase in the use of fiber optic test equipment (FOTE) is thus expected, especially optical time-domain reflectometers (OTDR) which are fundamental to characterize optical fiber infrastructure. Whilst OTDRs have been around for a while, vendors providing more innovative equipment for last-mile testing are expected to emerge as market frontrunners.

Vendors developing new products which can be customized according to emerging customer needs are most likely to be more successful than others in the market. Vendors also have to deal with increased competition in this sector and being able to compete against low-cost OTDR products designed and manufactured by companies mostly from Asia, makes business more challenging. Hence product differentiation and reliability are critical aspects needed to grow market share and increase customer base.

In addition, portable test instruments are being used more and more in research laboratories so their use is no longer being restricted to field applications. This means vendors looking to stand out would be wise to ensure their instruments cover different applications and offer features and functionalities beneficial for use in laboratories as well in the field.

Vendors who can meet these requirements are expected to emerge as industry frontrunners by expanding their customer base and increasing their market share.

New Product Attributes and Customer Impact

Match to Needs

VeEX Inc. (VeEX), a global leader in the fiber optic test equipment market has diligently worked on enhancing or redesigning all its OTDR products as the market evolves. One such example is the OPX-BOXe OTDR launched in June 2017, which significantly improved the communication-related capabilities of its popular OPX-BOX+ OTDR predecessor. Allowing Bluetooth and Wi-Fi functions to be active and always available in standby mode, eliminates the need for a permanent network connection to control the OTDR.

The new OPX-BOXe also supports remote control via wired Ethernet and a standard web browser expanding and simplifying its use in several applications.

VeEX's Fiberizer™ Mobile software however remains its dominant application as Technicians increasingly want to operate and control their test equipment using a WiFi or Bluetooth connection from their mobile devices. In the new digital era, contractors in general have become increasingly dependent on their iOS or Android mobile devices for email and workforce management functions – having a single dashboard for these back-office resources and being able to integrate fiber tools such as OTDR and Fiberscope is not only a big cost saving, but a huge technology step forward. VeEX anticipated this technology trend several years ago and was awarded a patent for “faceless” test equipment that can be controlled using mobile devices.

Since the Technician is almost always connected to the internet nowadays, the ability to upload test results and associated data directly to a Cloud server and repository increases efficiency exponentially. Fiberizer™ Cloud is a unique and revolutionary approach to gather and manage OTDR test data, perform trace analysis, and generate test reports. Fiber Installers working in hazardous or dirty conditions greatly appreciate being able to operate the OPX-BOXe OTDR from a remote, clean and safe location. The OPX-BOXe is available in different wavelength configurations including 1310nm, 1550nm, filtered or unfiltered 1625nm/1650nm, and 850nm multimode.

The MTTplus-410 fiber optics module, along with the embedded GPS receiver option installed in the MTTplus field portable platform, indelibly records the precise geographical location of the OTDR traces. In instances of fiber outage and when fast fiber restoration becomes critical, customers can refer to the GPS coordinates attached to the OTDR trace to identify the exact test locations using GIS mapping systems that are commonly available as part of remote fiber test systems. Armed with these coordinates, technicians can be dispatched quickly to the correct location for troubleshooting and repair purposes. The MTTplus platform also features a camera option so technicians can record the test site or environment, record the bar code of CPE enhancing their test reporting and proof of delivery.

VeEX's RXT-4111 DWDM OTDR module was the Industry's first, wavelength tunable OTDR suited for C-band DWDM networks. Service providers and Installers finally had a solution to verify end-to-end connectivity on live, repeaterless DWDM systems without disrupting traffic. This testing technology breakthrough was significant, especially at a time when TWDM PON deployments over existing Optical Distribution Networks (ODN) were becoming more prevalent.

VeEX's MTTplus-420 GPON module complements its OTDR solutions in GPON test applications. Technicians can verify optical power levels and decrypt messages shared between Optical Line Terminals (OLT) and Optical Network Terminals (ONT) to identify and proactively address any network issue.

VeEX's FX180 mini Optical Spectrum Analyzer employs patented micro-optics and tunable filter technology, allowing technicians to perform essential tests in CWDM and DWDM

networks. Multiple wavelengths and their power levels can be monitored for drift over time and optical signal-to-noise ratio (OSNR) values can be characterized on C-band DWDM spectrum using up to 96 channels @ 50GHz channel spacing. OSNR is critical in guaranteeing network performance and meeting the signal quality demands associated with increased data traffic.

Positioning

Following a strategy of constantly upgrading products to match customers' evolving needs, VeEX constantly engages with key customers, including AT&T, Deutsche Telekom, Nokia, and many more, during the product concept and design phase to collect input. When customers entrust VeEX to develop pioneering or next generation technology test solutions, the company usually offers prototypes to customers during the development to solicit additional feedback so it can proactively modify or adapt the equipment design to match the customers' exact needs. VeEX's experienced and highly trained sales channel around the world forms an integral part of this information collection process especially when language and culture can limit fast and accurate feedback. This collective feedback chain enables VeEX to gain a clear understanding of the evolving industry and technology trends as well as identify customers' changing expectations.

Price/Performance Value

Compared to most of its competing peers that use traditional or legacy methods to store data and perform software upgrades, VeEX enjoys a competitive edge with the VeEXpress™ cloud-enabled asset management system that is an integral component of each test set it offers. Using an embedded VeEXpress Client in the test set and an Internet connection, Users can instantly obtain visibility into the licensed features that have been assigned or purchased with each test set. This visibility allows users to quickly check software license status and keep the test set updated. VeExpress not only pushes software upgrades directly to the test set, but users can easily install or activate new software options via online license activation without having to wait days or weeks for the usual process to happen. New features or test options that have been purchased, leased-to-own, or rented are activated promptly using this cloud-enabled system. As a result, customers no longer have to buy test sets with additional expensive licenses that they do not require – instead, they can easily add options to meet their testing needs or budget limitations as and when needed. All of this leads to optimization of both time and cost, while enabling a streamlined workforce for efficient management of software and hardware thus boosting operational efficiency.

Despite factors such as restrained customer budgets and low-cost products originating from Asia, VeEX OTDRs are priced on the medium to higher end. Nevertheless, the company has witnessed a high adoption of its products owing to their excellent performance, quality and reliability. Discerning customers prefer products from a trusted vendor such as VeEX over cheaper products coming from low-cost manufacturers.

Scalability

In response to communication service providers' need for test platforms that can scale testing and boost productivity rates, VeEX has been releasing upgraded versions of its MTT and RXT platforms to support even more technologies using different types of test modules. By supporting multiple network technologies, the MTTplus platform allows users to seamlessly integrate test modules encompassing both legacy and newer, more advanced technologies. As respective test applications and requirements evolve, users can use the same test platform to seamlessly add new test modules and perform testing going forward in a cost-efficient manner without the need to purchase a whole new test platform. VeEX has taken extra-ordinary steps to respect previous MTT customer investments by ensuring backwards compatibility with previous generation modules, allowing users to reuse selected modules with an optional Carrier module on its newer MTTplus platform. One single graphical user interface for all test modules further simplifies user navigation, translating into a simplified operational experience and no need to re-train users. The RXT platform is another outstanding example of this backwards and forwards commitment to existing and new customers.

Customer Purchase Experience

Budgetary constraints increasingly drive customers towards one-stop-shop purchases that not only simplify their buying experience but also cut down on their total cost of ownership (TCO). Meeting this need enables vendors to differentiate themselves from competition. Buying various equipment and add-ons from different vendors causes interoperability issues, which slows down installation as well as integration processes. Customers, consequently, witness a marked increase in their capital as well as operational expenses, along with a considerable decline in their productivity rates. Furthermore, reliability plays an important role in influencing customers' purchase decisions.

Fiber optic testing equipment that offers reliable performance and low TCO is certainly poised for increased adoption. Although customers embrace a new product, they still expect the same value proposition they have been enjoying from the previous product.

As a trusted vendor of innovative test and measurement solutions for advanced communications and networks, VeEX offers customers a one-stop-shop buying experience. This simplifies the entire purchasing process as a single purchase order from VeEX covers all equipment and tools the customer needs. Furthermore, this convenience saves customers time otherwise wasted in going from one vendor to another to secure the different equipment and accessories they require. All equipment and add-ons from VeEX alleviates interoperability and integration issues, as well as eases maintenance and servicing, which reduces TCO and boosts productivity levels. Ultimately, the one-stop-shop experience and resulting benefits simplify the customer purchase experience and pave the way for repeat orders.

VeEX's success lies in providing all of these features at an affordable price point, thus being able to compete successfully with its Tier I vendor counterparts around the world.

Customer Service Experience

Having established its authorized service centers in Plymouth (UK), Fremont (US), and New Taipei City (Taiwan), VeEX looks to improve the quality of customer service experience by extending after-sales support service to its worldwide customer base. Its technically skilled experts enable customers to reap the utmost benefits out of its newly released products by deploying the current upgraded features into customers' existing platforms and calibrating equipment in alignment with their respective fiber testing requirements. Customers facing hurdles with respect to operation of VeEX's products can easily download literature and training guides on its released products for reference. The warranty on its products—software, firmware, and hardware—along with the after-sales assistance it offers, convince customers to perceive VeEX as a reliable brand, driving product sales.

Brand Equity

Supported by direct sales and support operations established in Philadelphia (US), Paris (France), Prague (Czech Republic), Guatemala City (Guatemala), Kuala Lumpur (Malaysia), Seoul (Korea), Shenzhen (China), and Bangkok (Thailand) with headquarters in Fremont (US), VeEX has been successful in establishing its global footprint. The company sells its wide product portfolio directly to key customers domestically (USA) while most of its international sales are carried out via channel partners and distributors that have sound market knowledge, hold strong rapport with customers, and keep track of both evolving market trends and customers' changing preferences in their target territories.

VeEX was founded by veterans from the test and measurement industry over a decade ago. This strong and experienced foundation and head start combined with superior customer rapport and intelligence, has empowered the company to understand changing customer requirements and develop products that rightly fulfill them. The customer-inspired products are complemented by efficient after-sales support, translating into superior customer satisfaction. In fact, customers consistently place repeat orders and renew supply contracts with VeEX, demonstrating the trust they have for this reliable brand.

VeEX's June 2013 acquisition of Sunrise Telecom Incorporated (Sunrise Telecom), a market leader in offering test, measurement, and workflow management solutions for wireless operators, customers in the telecommunications and cable markets, as well as equipment manufacturers, was a strategic move to expand and solidify its brand visibility. VeEX still leverages some of Sunrise Telecom's salesforce and partners including its global sales and distribution network to reach out to customers based internationally. VeEX acquisitions of Agizer/OptixSoft in July 2014 and Digital Lightwave in April 2016, strengthened its workforce, expertise and product portfolios in fiber optics and transport technologies respectively.

Conclusion

A globally-leading and trusted vendor of test and measurement solutions for communication service providers, VeEX successfully stays ahead of its competition and offers customers products just when they need them. VeEX has a strong customer feedback mechanism in place, which it leverages to ensure the products it offers feature customer-approved designs. The company's approach of constantly upgrading its test platforms and releasing new test modules to fulfill customers' ever-expanding fiber network testing needs led to the launch of products such as OPX-BOXe OTDR, RXT-4111 DWDM OTDR, FX180 Optical Channel Analyzer, and various MTTplus test modules—MTTplus-410 fiber optics module and MTTplus-420 GPON, among others.

Despite competition from low-cost products out of Asia, VeEX witnesses high product adoption owing to the reliable and high-end performance of its offerings. Customers reap utmost benefits out of its tried and proven products, supported by the efficient customer service and a strong distributor network, all of which translates into a highly satisfying customer experience.

With its strong overall performance, VeEX has earned Frost & Sullivan's 2017 New Product Innovation Award.

Significance of New Product Innovation

Ultimately, growth in any organization depends upon continually introducing new products to the market and successfully commercializing those products. For these dual goals to occur, a company must be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding New Product Innovation

Innovation is about finding a productive outlet for creativity—for consistently translating ideas into high-quality products that have a profound impact on the customer.

Key Benchmarking Criteria

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated two key factors—New Product Attributes and Customer Impact—according to the criteria identified below.

New Product Attributes

- Criterion 1: Match to Needs
- Criterion 2: Reliability
- Criterion 3: Quality
- Criterion 4: Positioning
- Criterion 5: Design

Customer Impact

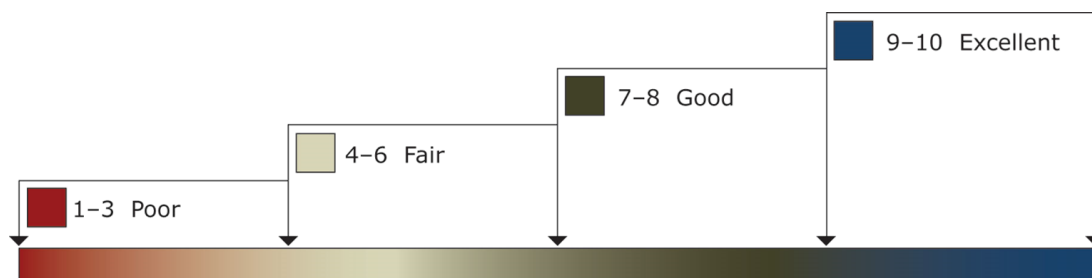
- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

Best Practices Award Analysis for VeEX Inc.

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard is organized by New Product Attributes and Customer Impact (i.e., These are the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard.). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key participants as Competitor 2 and Competitor 3.

<i>Measurement of 1-10 (1 = poor; 10 = excellent)</i>			
New Product Innovation	New Product Attributes	Customer Impact	Average Rating
VeEX Inc.	9	9	9.0
Competitor 2	8	7	7.5
Competitor 3	7	7	7.0

New Product Attributes

Criterion 1: Match to Needs

Requirement: Customer needs directly influence and inspire the product's design and positioning.

Criterion 2: Reliability

Requirement: The product consistently meets or exceeds customer expectations for consistent performance during its entire life cycle.

Criterion 3: Quality

Requirement: Product offers best-in-class quality, with a full complement of features and functionalities.

Criterion 4: Positioning

Requirement: The product serves a unique, unmet need that competitors cannot easily replicate.

Criterion 5: Design

Requirement: The product features an innovative design, enhancing both visual appeal and ease of use.

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience

Requirement: Customers feel they are buying the most optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience

Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.



Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify Award recipient candidates from around the globe	<ul style="list-style-type: none"> • Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies 	Pipeline of candidates who potentially meet all best-practice criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> • Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates 	Matrix positioning of all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> • Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> • Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles 	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> • Share findings • Strengthen cases for candidate eligibility • Prioritize candidates 	Refined list of prioritized Award candidates
6 Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> • Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates 	Final list of eligible Award candidates, representing success stories worldwide
7 Perform quality check	Develop official Award consideration materials	<ul style="list-style-type: none"> • Perform final performance benchmarking activities • Write nominations • Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best-practice Award recipient	<ul style="list-style-type: none"> • Review analysis with panel • Build consensus • Select recipient 	Decision on which company performs best against all best-practice criteria
9 Communicate recognition	Inform Award recipient of Award recognition	<ul style="list-style-type: none"> • Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance 	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 Take strategic action	Upon licensing, company is able to share Award news with stakeholders and customers	<ul style="list-style-type: none"> • Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning 	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.